of such a trade, "A few more laborers, a great deal more product—a few less laborers, a great deal less product." In technical jargon, the marginal productivity is high. If there are so many crowding into the occupation that you can say, "No more are needed," or "A few more laborers, very little more product,—a few less laborers, very little less product," it is not likely that any employer will offer high wages in such an occupation. The marginal productivity of labor is low.

No wage board, however, would need to waste any time trying to figure out the marginal productivity of labor. The equilibrium of demand and supply would be a better indication than any figures that any body of experts would be likely to find. All they would need to do would be to see whether the wages were sufficient to attract into the occupation as many workers with adequate skill and training as employers were willing to employ.

I have read most of the things that have been written in recent years to becloud this issue. It would be a tedious and rather profitless task to go over their arguments in detail. I have decided that the most effective refutation is to state the essential principle in as definite and dogmatic form as possible, leaving readers to make up their own minds as to the relative reasonableness of the contending theories.

Factors Determining Real Wages

By ERNEST MINOR PATTERSON
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ECONOMIC theorizing is by no means confined to professional economists. So-called practical men of necessity have their theories on economic questions, or they would not be able to direct the enterprises which they lead, or to formulate policies in connection with them. Both business men and economists have suffered from two weaknesses in their theorizing, and several of the articles before us for discussion in this issue of *The Annals* indicate what these difficulties are.

One is the desire to find an explanation of economic happenings in as broad principles as possible. Physicists, chemists, astronomers and others are constantly seeking for all-inclusive generalizations such as the law of gravitation, the periodic law, the law of inertia. Such generalizations are extremely valuable, and with their aid much more progress can be made than without it. If similar laws could be found in the social sciences, they would be equally helpful. There is much reason, however, to doubt whether such laws can be formulated, at least with our present knowledge. The field of social science is one in which there are so many forces of such unknown or immeasurable strength that it is probable that very few broad generalizations can as yet be made. Certain it is that not many of the so-called laws in economics have been able to stand the test of current criticism.

One of the reasons for this is to be found in the second of the weaknesses referred to, which is a failure to adapt economic theorizing to changing conditions. Economics must build on certain assumptions taken from other sciences. In the last fifty or seventy-five years these other sciences, notably biology and psychology, have been so revolutionized that the bases on which economists built have been strongly shaken, if not entirely swept

away. More than most of us realize the structure of economic theory has been built on hedonistic and rationalistic assumptions no longer acceptable to biologists and psychologists. The trouble has been intensified by the changing nature of the phenomena with which economics deals. A hundred or more years ago, economic organization was more largely competitive than at present, and *laissez faire* was a more generally accepted doctrine than it is today. With the passage of time monopoly has become much more prevalent than before, and government exercises a far greater degree of influence in the conduct of business affairs.

These difficulties should be kept in mind in an analysis of the problem of wages. We may first of all assume that we are primarily concerned with real wages instead of with money wages. This will lead to the conclusion that fluctuations in the price level, which change the amount of real wages received, should be corrected, and that we need not disapprove any forces that are designed to bring this about. Trade unions, administrative bodies and other influences may be satisfactory aids in securing this result.

ADDITIONS TO WAGES FROM RENT, INTEREST AND PROFITS

As we turn from money wages to real wages, we may observe that these may be increased by additions to the wage scale from either of two sources. One is by deductions from rent, interest and profits without any increase in the aggregate volume of community output. The other is by increasing the product of the community, thus furnishing a larger return to the factors in production, with the expectation that labor will share in the general gain.

While it is doubtless true that many particular enterprises cannot pay higher wages and continue to survive, it does not follow that the industry of the community as a whole is similarly handicapped. The enterprises referred to are in many instances marginal plants operated, perhaps, on an extremely inefficient basis. Their elimination under pressure would in many cases merely mean that the business formerly secured by them would go to more efficient plants whose productivity per unit of effort is greater. With a larger return they might be able (though perhaps not willing) to pay a higher wage scale. Similarly, a curtailment of profits and a diversion of this fund to wage earners would give them a larger return, and would not seriously affect the aggregate productivity of the community. Frequently profits are sufficiently great to warrant us in concluding that if a workable device were found for transferring a part, at least, of this sum to wage earners in higher wages, there would be no decrease in productivity.

In some cases it is doubtless true that a reduction in the amount of interest paid would in no way affect the aggregate amount of saving. It is quite generally agreed that much saving would be done without any offer of interest, and many contend that by far the larger part of current additions to the capital fund comes from profits rather than from the economies of those who are induced to save by the offer of interest payments. If here, too, some device could be found which would divert some part of these interest payments to wage earners rather than to capitalists, the wage earners would gain.

In reply to this argument it may be contended that even if these amounts could be diverted to wage earners they would save so little that we should not have each year the appropriate additions to the capital fund of the com-

munity. It is contended that wage earners would devote any extra income to establishing higher standards of living, and that the total volume of community saving would be less than we have today. This, however, is by no means self-evident. Much that goes in rent, interest and profits today is certainly not saved, but is spent in the purchase of luxuries. Then, too, it is by no means clear that in the period from, say 1896 to 1914, appropriate amounts were diverted to our capital fund. It is quite possible that during that period the world set aside a larger amount than was advisable for construction purposes, thus lessening the output of consumption goods for the sake of a presumed increase in the output of such goods in the distant future.

Diversions of certain amounts from rent, interest and profits to wages, need not be made in a direct manner, but may be accomplished indirectly. Any form of direct tax on these funds, particularly on rent and profits, might make possible the levying of lower indirect taxes, and thus leave with wage earners a larger fraction of their gross incomes for expenditure on comforts and luxuries. Any shift from direct to indirect taxation is in effect a lowering of real wages, since workers who are compelled to pay higher prices are compelled to resort to a lower standard of living. Wages may also be increased, of course, through profit-sharing plans which give to the workers a larger return.

Such information as we have regarding the national income indicates, however, that the total volume of product is not so large that we can secure any great improvement in the condition of wage earners without some increase in productivity. The estimates of Professor W. C. Mitchell and others, which are the most recent and the most reliable, show that our total national income was only $28,800,000,000 in 1909, and $60,040,000,000 in 1918,[1] while the average annual earnings of employes normally engaged in all industries was only $626 in 1909 and $1,078 in 1918.[2] Such estimates give weight to the contention that not only is the amount received by labor deplorably small, but that the total product is not sufficient for any great increase in the per-capita wage even though complete justice in distribution were assured.

WAYS OF INCREASING PRODUCTIVITY

One of the most fundamental of the proposals for securing larger output is presented by Professor Carver.[3] He has merely restated with his characteristic clarity and vigor his adherence to the idea of proportionality. The problem, he argues, is that of securing the proper relative amounts of the natural resources, capital and labor that are employed in production. The best possible arrangement is one in which the amounts of each are so nicely adjusted that the desired output is secured. Natural resources are the least variable in volume, but capital is the result of saving. If owners of capital are receiving a high return, this will encourage saving, add to the supply of capital and thus lower the rate of interest. There will be more product, and a larger amount than before will go to labor. If laborers are so numerous that their per-capita receipts are meager, their numbers should be restricted by limiting immigrants from abroad and from heaven. If some are very highly paid, while others (say the unskilled) get but little, train more

[1] *The Income in the United States*, p. 13. Harcourt, Brace and Company.

[2] *Ibid.*, p. 102.

[3] *Cf.* "The Equilibrium Wage" by T. N. Carver in this volume.

men for the positions that pay well, leaving fewer for the unskilled tasks, the pay for which will then increase.

In our discussion of other methods of aiding in the problem, there is danger that the truth of Professor Carver's contention will be overlooked. It is as fundamental as any argument could well be, but it is by no means a complete answer to the question raised. Its weakness is that it does not make due allowance for the changes that have come in our knowledge of human beings and in the economic organization of the world.

To a degree Professor Carver recognizes this by assenting to a minimum wage "based upon the cost of living according to the lowest standard of living that is consistent with a dignified and civilized life." Free competition with complete mobility of the factors of production does not exist. Birth control and restraints on immigration do not as yet operate sufficiently well to solve the difficulties; hence, a minimum wage as described, but beyond this the equilibrium of demand and supply.

The solution is a good one, but by no means adequate. The older economics assumed a greater mobility of labor and capital than existed even a hundred years ago, and that grows less as the years pass. Also, it viewed men as productive units which would merely struggle for "higher wages, shorter hours and better working conditions." But organization has grown on both sides, until today the amount of competition as compared with monopoly is far less than before. Among laborers notice, for example, the American Federation of Labor and the great labor unions of Europe. Moreover, these workers refuse to accept theories of specific productivity as settling the matter. They refuse to consider themselves as productive units whose remuneration is to be determined by an equilibrium of demand and supply. Sabotage of all sorts is practised by them even as it is practised by their employers, who refuse to operate at a loss or who even destroy products to raise prices.

With the old assumptions and theories workers are dissatisfied, and many employers agree with them. No longer can it be claimed that in spite of its faults capitalism works so well that the world must not experiment with untried methods. Capitalism itself is a changing thing, and is today far different from the organization of twenty-five years ago, In its modified form it is still functioning so haltingly that many thoughtful business men realize that still further changes must come. Only the evening before this article was prepared the writer attended a lecture where he saw a well-known banker and an equally prominent diplomat applaud a speaker who stated that European labor is critical of traditional capitalism and demanding that labor be allowed to aid in the direction of industry.

The wage problem, then, is in part a problem of better distribution, and in part one of larger production. But larger product is dependent on many things. The Committee on Elimination of Waste in Industry of the Federated American Engineering Societies has recently issued a report entitled *Waste in Industry*. To this committee waste is nothing more than a failure to attain standards of accomplishment that have already been demonstrated in practice as feasible. Their assessment of responsibility for existing waste in certain industries studied, places on management percentages ranging from 50 per cent in textile manufacturing to 81 per cent in the metal trades. Labor is held responsible for only 9 per cent in the metal

trades and for 28 per cent in printing, where its responsibility was thought greatest. Other factors than management and labor are held responsible for the other wastes.

This report is only another evidence of our shifting of attention from problems of distribution to problems of production, a change which is due to our realization of the inadequacy of our total product, to the growing sabotage by both capital and labor, and to the recognition of an appalling waste in our industrial processes. Its significance here lies in the fact that it makes clear that management is responsible for more of the retardation and waste of today than is labor. Since wages depend so much on aggregate output, more criticism and advice should be directed to management than to workers. Emphasis should be given to this, for it is being continually overlooked in wage discussions. To repeat: Real wages are definitely affected by the volume of output. The more goods produced, population remaining unchanged, the more the per-capita product, *i.e.*, the higher real wages may become. Sabotage and other forms of waste lower real wages. But the committee of engineers just referred to conclude not only that the waste is serious in certain industries they have examined but that over 50 per cent of the responsibility rests with management and less than 25 per cent with labor. Now, mere increase of product does not necessarily mean higher wages, since much depends on its distribution. Nevertheless, much depends on the effectiveness of management.

WAGE THEORIES USUALLY INADEQUATE

A given wage theory may seem quite logical and yet be of little aid in an emergency. The late President Van Hise once told the writer that he had searched economic theory in vain for assistance in arbitrating wage disputes; yet we are concerned with the fact that we want results. Our theories are an attempt to generalize on the facts. The generalizations have often been used in an attempt to convince workers of the justice of the existing scheme of distribution. They have not been convinced because, after all, the product is a joint one and a determination of the contribution of each factor, and hence of the appropriate reward for each, is impossible. The theories may or may not be accurate descriptions of fact, but as stated they fail to convince workers of the justice of their reward. As Professor Tawney has pointed out,[4] it is time to shift our thoughts from *rights* to the more important idea, which is *function*. We must get better results.

What, then, should be our wage theory? The writer is unwilling to accept any one theory unless it be that those policies should be adopted that will secure results—and that is a rather vague generalization. Instead of one theory there should be several.

First of all, the law of proportionality has its place. Professor Carver's statement of it cannot be improved upon, and no matter what the form of social organization, it must not be ignored. But by itself it is far from adequate. Along with it should go a minimum wage as a protection in a society where otherwise many would be crushed.

But that is not all. The "state of the arts" must be improved. Scientific management has done much, and relative rating as proposed by Dr. Mitchell[5] offers assistance if applied with discretion. Its weaknesses are two-fold: First, it is essentially an

[4] Tawney, R. H.: *The Acquisitive Society.*

[5] "Relative Rating Versus Cost of Living as a Basis of Adjusting Wage-Rates."

adaptation of the piece system, and as such may be grossly abused by unscrupulous employers unless it is closely safeguarded. Second, it assumes the possibility of measuring productivity. It should be repeated that product is a result of the functioning of several factors. It is a joint product, and the contribution of any one factor or of a single unit of that factor is essentially indeterminate, unless by the theory of specific productivity (which fails to convince the interested parties, the workers). The wage paid under Dr. Mitchell's plan is accordingly made up of two parts. If A threads 200 bolts in a given time while B threads only 100, A has clearly done more than B, and the latter may assent to A's receiving more pay. But how much more? There are two elements: the basic amount B produces and the differential between his product and that of A. But both of these are the joint products of labor working with tools and materials. The exact product of neither can be determined. Consequently the idea cannot by itself be accepted as a final or a sole solution of the wage problem.

Another element is the necessity of recognizing that the laborer is not entirely wrong when he "makes work." Maximum productivity is not always to his best interest. At the close of the late war workers were exhorted to increase their productivity, but soon they were informed that products were largely in excess of orders, and that factories must close. What is the difficulty?

It lies in the fact that even just distribution (assuming we could agree about it) and maximum productivity are inadequate explanations. Our world is too intricate and cumbersome for such formulae. Production must be of the appropriate kind, and mere exhortation to increase its amount and then trust to the "invisible hand" or some similar influence is folly.

Thus production may be of luxuries or non-essentials. This is because the articles that are to be produced are determined by prospective profits, which may lead to greatly increased construction of garages and moving picture theaters when there is a dearth of dwellings, or to the manufacture of an unduly large volume of limousines when other commodities are more needed.

Or production may be of necessities, but not wisely chosen. Shoes may be manufactured in relatively too large numbers as compared with the output of cotton cloth or steel rails. Production should be properly diversified if maximum results are to be secured and higher wages follow.

Then, too, our efforts may be directed too largely to the production of capital goods such as railways and irrigation projects, with a view to a large output of consumption goods in the distant future, but with a restricted output of consumption goods in the immediate present.

These last few paragraphs seem a little remote from the worries of a given employer over the wage scale for his plant, but the connection is a real one. We are discussing wage theories and the problem cannot be properly treated unless we realize its many ramifications from the field of distribution into management, business cycles, overinvestment and other related topics.

PARTIAL SOLUTION IN THE EFFECTIVE FUNCTIONING OF INDUSTRY

In conclusion, we should note that no wage theory will long be satisfactory if it bases wages merely on the comparative strength of the parties to the wage agreement. Orthodox theories and much current practice have this defect. Herein lies the strength of the

arguments for a minimum wage, a cost of living standard, relative rating, profit sharing and other like devices. But none of these by itself is adequate nor all of them combined. There must also be a recognition of the fact that labor is one of the contributors to a joint product, but that the part it has produced is indeterminate. Instead of deluding ourselves with the belief that it can be ascertained and labor then be given the amount of the product to which it has a right, we should concern ourselves more over the effective functioning of industry. Labor is coming more and more to appreciate its potential power, and is constantly more critical of the weaknesses of management. Such experiments as industrial councils and other devices which give to workers a larger share in management are a partial solution of the problem.

Only partial, however. No solution is final or complete even for a brief time. The reasons that the present trouble is so acute is that conditions change so rapidly—more rapidly than do our ideas, our theories. Thus the very success of works councils in bringing together employer and employe in a given industry may lead them to recognize their gain in restricting output and in then raising prices to their mutual advantage. Such a move means higher wages in that industry, at least for a time, but the higher price for that product means a lower real wage for every purchaser of it. If such restrictions in output became general, productivity as a whole would be seriously curtailed. No one theory gives the answer today, and no solution will be final.

The Relation Between Wages and National Productivity

By GEORGE SOULE
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AS the pursuit of economic science passes from qualitative analysis to the assemblage and interpretation of quantitative data, students grow more wary of enunciating its "natural laws." Even the laws of the few exact sciences such as physics and chemistry are now suffering a series of shocks from the acquisition and analysis of new facts; and the followers of the still slender trail of economics through the unexplored jungles of human behavior do well to assume a certain diffidence. The present writer has no intention of discussing here the productivity or any previous theory of wages, except as such inadequate statistical data as we have may throw light on them. Likewise, it is incautious to set down any immutable "principles," new or otherwise, for the use of employers, unions or arbitrators in the determination of wage-rates. We have learned from the modern psychologists that principles, so-called, are often little more than weapons seized or defenses thrown out in the presence of conflicting desires, and that, while they are often of a high temporary utility in the heat of battle, they sometimes become embarrassing with a change of terrain or of relative power.

Whatever may be the underlying laws, the surface phenomena surrounding the determination of basic wage-rates are usually highly controversial, and suggest that there is little to influence the result save the respective power of the two parties immediately